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ABSTRACT

The papers reproduced in this collection were originally prepared for presentation at a February 1976 symposium at the annual meeting of the American Association for the Advancement of Science. The symposium summarized a series of three regional seminars on National Energy Policy in a Regional Context; these seminars were held in Minnesota, New Mexico, and California. Five papers are included in this publication. The first highlights some of the major conclusions of the Ford Foundation's Energy Policy Project, particularly those with implications for planning at the sub-national level. The next three papers present energy problems as viewed from Minnesota, New Mexico, and California. The last paper considers prospects for interregional cooperation in energy policy planning. (RH)

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AAAS Division of Public Sector Programs

Case Studies in Regional Energy Planning

Edited by
William A. Blanpied
Gretchen Vermilye

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American Association for the Advancement of Science
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at the 142nd Annual Meeting
of the
American Association for the Advancement of Science
18-24 February 1976
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INTRODUCTION

The papers reproduced in this collection were originally prepared for presentation at a 23 February 1976 symposium on Case Studies in Regional Energy Planning at the Annual Meeting of the American Association for the Advancement of Science in Boston. The symposium in turn was organized to summarize a series of three regional seminars on National Energy Policy in a Regional Context which was organized by the AAAS under a grant from the Ford Foundation's Energy Policy Project. The seminars were held in Chanhassen, Minnesota on 14 October 1975,[1] in Albuquerque, New Mexico on 2-5 November 1975,[2] and in San Diego on 14-15 January 1976.[3] All three used the Energy Policy Project materials as points of departure for exploring the implications of one or more specific energy-related issues of particular concern to the regions in question. The series was one of several which the AAAS has been organizing to provide

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1 "End-Use Regulation: Beginning the Debate, "edited by Gretchen Vermilye and William A. Blanpied, AAAS publication No. 76-R-1, February, 1976.

2 "Energy, Water and the West--the impact of energy development on western water resources," edited by Elizabeth R. Gillette, AAAS Publication No. 76-R-2, June 1976.

3 Proceedings in preparation

for people representing a range of societal institutions to explore critical issues with appreciable scientific and technological content.

Although the specific regional issues addressed at the three energy policy seminars necessarily differed, as did the perceptions of the critical issues themselves, the same implicit questions underlay the entire series: To what degree and by what means can energy policy planning be carried out at the sub-national level? How can the broadest possible spectrum of informed citizens become involved in the planning process? and, finally, What are the prospects for long-range, inter-regional planning?

As an energy importing state positioned mid-way between the populous, energy-poor East Coast and the energy-rich Rocky Mountain West, Minnesota faces the certain prospect of increasing shortages of oil and natural gas that are bound to result in severe economic and social dislocations unless a long-range plan for the rational use of these resources is adopted.

To many people, southern California represents the epitome of a region whose economy and life-style is based on the assumption of an unlimited supply of cheap energy, virtually

all of it imported from outside the state.

In contrast, the Rocky Mountain West possesses considerable untapped energy resources which, if exploited, could supply much of the demand of other regions of the country. Yet the development of these resources would require the diversion of scarce western water resources from agriculture, and, if developed without due regard for the environment, could result in irreparable damage.

These issues and others were addressed at the three regional seminars and the symposium in Boston. The first of the five symposium papers, by Charles P. Eddy, highlighted some of the major conclusions of the Ford Foundation's Energy Policy Project, particularly those with implications for planning at the sub-national level.

Philip Getts, Eileen Grevey, and Jeffrey Kirsch then presented some of the realities faced by energy policy planners in their respective regions of the country. Each of these authors is deeply involved in developing and helping to carry out those plans; they also worked closely with AAAS in organizing its regional energy policy seminars.

In the fifth and final symposium paper, Donald R. Cunningham

discussed problems and prospects for interregional cooperation in energy policy planning.

Although more than two years have elapsed since the desirability of developing energy policy plans was first demonstrated to a large segment of the American public, a national consensus regarding the detailed nature of those plans has yet to emerge. The three AAAS energy policy seminars suggested, however, a remarkable willingness on the part of representative groups of concerned citizens to face up to the realities of planning at the regional level, and, in particular, to reexamine the tacit assumptions they may have made concerning the place of their own institutions and personal life styles within the context of the larger society. The Boston symposium provided an opportunity for representatives from four diverse regions to compare their own perceptions of energy-related problems, and, perhaps, to appreciate the perceptions that are emerging from regions other than their own. The papers presented on that occasion are reproduced here with the hope that they can contribute to reasoned discussions of the various options for energy policy at both the regional and the interregional levels.

William A. Blanpied
May 1976

THE ENERGY POLICY PROJECT IN RETROSPECT-
SOME IMPLIC..TIONS FOR REGIONAL DEVELOPMENT

Charles P. Eddy
Senior Staff Member for Energy Programs
Council on Environmental Quality

It's a pleasure to be able to address you today, principally as a former member of the Ford Foundation's Energy Policy Project, and also as a present member of the staff of the Council on Environmental Quality, an organization that is deeply concerned about the environmental, social, and economic impacts of domestic energy exploitation.

The Ford Foundation set the Energy Policy Project in motion in late 1972, and by early 1973 the Project had a number of studies under way. In light of subsequent events -- the 1973 Arab oil embargo and the abrupt heightening of national energy awareness -- one is inclined to attribute a certain amount of clairvoyance to the Ford Foundation.

Our intensive two-year effort at the Project produced some 20 printed volumes of studies and reports, many of them pioneering efforts in the field of energy policy. Most details of this effort are beyond the scope of today's discussion. I would like to highlight the Project's principal conclusions and recommendations pertaining to energy conservation; examine what these mean in terms of supply alternatives, in light of these conclusions, and briefly discuss where we are today and the implications for regional energy development.

In the two years since the Arab oil embargo -- and since the preliminary and final reports of the Energy Policy Project, we have witnessed an intensive, continuing debate about energy. A number of steps have been taken during the quest for a "coherent national energy policy," but much remains to be done. It is important to recognize that energy policies are ephemeral, changing with technological breakthroughs, with shifting prices, and with discovery or depletion of resources. The many and complex federal, state, and local government actions and private sector activities which are involved in energy policy make it unlikely that we will ever see a firm statement of national energy policy. The Energy Policy Project pointed toward an energy policy structure, and set out the important policy objectives and components.

The scenario envisioned by the Energy Policy Project I feel is still valid in most of its important aspects. We started by taking a hard look at the historical energy growth trends in the United States. From 1950 to 1973 energy demand grew at an average annual rate of 3.5 percent a year. In the period 1965 to 1973 the rate was substantially higher, averaging 4.5 percent per year. This translated into a 1973 consumption level of 75 quadrillion British thermal units, roughly a third of the world's consumption of energy.

We then looked to see what technically and economically feasible steps could be taken to reduce these energy demand growth rates. Our research indicated that energy consumption could be held to an average annual growth rate of 2 percent a year by 1985, with GNP continuing to grow at historical rates. Under this "technical fix" scenario, employing essentially known efficiency improvements, the nation could, over the next 25 years, achieve a net savings in capital investment of about $300 billion, out of the capital requirements required to sustain historic growth rates.

Further, it appeared feasible to sustain economic growth under a zero energy growth future, although the implications of this scenario required further study and analysis.

Summary of EPP Scenarios

(Demand in Quadrillion British Thermal Units)

	1985	2000
Historic Growth	116	185
Technical Fix	91	124
Zero Energy Growth	88	100

Interestingly, since 1973 we have experienced a negative energy demand growth rate. In 1974 total consumption was 73 quadrillion BTU, and for the first six months of 1975 it was 36 quadrillion BTU. Although there are indications of an upswing in late 1975, this apparent decline in energy demand can be attributed in part to the depressed state of the economy, in part to the shock of substantially higher prices, and in part to development of citizen awareness and a conservation ethic. While this may be a temporary aberration on our energy charts, and the national could easily resume historic growth patterns, some very significant savings have been realized without implementing in any significant way the major policy initiatives recommended by EPP. This suggests that perhaps there was much more fat in the system than we thought, and that perhaps our estimates on savings were too modest.

Briefly, the following are the major policy recommendations of EPP in connection with the technical fix scenario and the relevant actions being

taken or considered at the present time.

Changes in Energy Pricing are necessary in order to fully reflect the full costs of producing energy. This, of course, has been at the heart of the Congressional-Presidential debate on energy policy.

- Redesign of electrical rates to reflect peak load costs and eliminate promotional discounts. There has been some action by state utility commissions, but no comprehensive national policy or guidance.
- Oil pricing will remain under partial control for at least three more years, while some subsidies such as the oil depletion allowance, have been modified or eliminated.
- Natural gas prices remain controlled, although they have been allowed to rise significantly.
- It is unclear that present environmental controls, in the absence of supplementary pollution taxes, are adequate to fully internalize the environmental costs of energy production.

Incentives for more efficient space conditioning, important for achieving a major block of savings in the residential and commercial sectors, have not been forthcoming.

- National building code proposals have been stalled in Congress.
- Proposed federal loan tax relief and technical assistance programs have not been enacted, although the new Federal Energy Policy and Conservation Act will provide assistance to states desiring to develop conservation programs.
- Again, there has been some movement at state and local government levels.

Government action on automobile performance, is the clearest area of strong federal leadership. The Energy Policy and Conservation Act directs the achievement of a model average of 27 miles per gallon by 1985, years ahead of the EPP recommendation. Achieving this mandated standard, like the Clean Air Act standards, will depend ultimately on the attitude of the automotive industry and consumers.

Government research, development, and demonstration programs are necessary to spur energy conservation technologies.

- The Energy Research and Development Administration has been established, with a separate Conservation Division.
- The conservation R&D budget has grown from a FY 1975 level of $4.5 million to a proposed 1977 budget of $113 million (proposed).
- Yet unlike the energy RD&D programs, the focus is almost entirely on demonstrating near-term, presently available technologies. There is as yet no comprehensive program for longer term RD&D.

Some progress has been made in implementing the policies necessary to reduce demand growth. Continued high energy prices might further reduce growth in energy demand, but it is clear that further concerted government action would be required to hold this growth to a 2 percent level.

Supplying the Demand

Even if the nation can reach this level of demand growth by 1985 and beyond, we will still be faced with energy supply needs which will be 28 percent larger than they were in 1973. Briefly, the EPP concluded that supply requirements through 1985 could be met without large-scale commitment to controversial new energy supply systems. Exploitation of undeveloped oil

and gas provinces of the Outer Continental Shelf could be delayed, large-scale development of western coal could be postponed until it could be developed in an environmentally satisfactory manner, and oil imports could be held to 1973 levels or lower. Increased oil and natural gas from the lower 48 states, onshore Alaska and the Gulf of Mexico would combine with secondary and tertiary recovery from existing wells to meet increased demand. Coal production would expand from deep mines and areas where surface reclamation is possible. Electric power could be met from those plants already committed to construction.

The importance of conservation is most readily apparent in terms of allowing substantial flexibility on the supply side. Under historic growth patterns, our analysis showed that full scale development of all domestic energy resources combined with extensive imports would be necessary. Even under the EPP technical fix scenarios it would be necessary to go ahead with at least some controversial supply sources to meet post-1985 demand projections, although on a much more moderate scale than under historic growth rates.

Technical Fix Energy Supplies

(Quadrillion BTU's)	Actual	Self-sufficiency		Environmental Protection	
	1973	1985	2000	1985	2000
Domestic Oil	22	30	36	29	35
Shale Oil	0	1	3	0	1
Synthetic liquids from coal	0	0	3	0	3
Imported oil	12	6	6	12	12
Nuclear	1	8	11	5	3
Coal (except synthetics)	13	16	22	14	22
Domestic gas	23	27	32	26	32
Synthetic gas from coal	0	0	1	0	0
Imported gas	1	1	0	2	4
Hydro	3	3	4	3	4
Geothermal	0	0	2	0	2
Other	0	0	2	1	4
Conversion losses from coal synthetics	0	0	2	0	1
Totals	75	92	124	92	123

These supply assumptions also warrant examination against the actual events of the past two years.

Oil. While petroleum demand has actually decreased, post-embargo imports have increased to nearly 40 percent of United States consumption. Clearly this is cause for concern. In retrospect, the EPP estimates of production potential from the lower 48, onshore Alaska, and the Gulf of Mexico were probably too optimistic. Since the EPP final report, the U.S. Geological Survey has reduced its estimates of reserves and potentially recoverable resources. Since there has been virtually no drilling in new offshore provinces, the reserve expectations there are speculative. Substantial new finds could alter this picture by the early 1980's. However, there is little sign of the high expectations for secondary and tertiary recovery coming to fruition.

Natural gas. The uncertainties about future domestic supplies are similar to those for oil. Absent significant new discoveries, the tendency will be to rely increasingly on expensive imported and Alaskan gas, and, eventually, perhaps on synthetic gas.

Nuclear. Nuclear power, at least its extensive application, is increasingly uncertain as a major component of energy supply. Recent cutbacks and delays in orders for light water reactors in the face of reduced electric demand, uncertain nuclear economics, unresolved questions over plutonium recycle, plant safety, safeguarding of materials, and waste disposal make it questionable that nuclear power will increase five to eightfold by 1985, as projected by EPP.

Coal. Demand and production have increased slightly since the embargo, although not quite at the rate anticipated in the EPP supply cases.

Uncertainties about Clean Air Act requirements, which should be resolved by this Congress, and about mined land reclamation standards, coupled with the utilities' increasing uncertainty about future electric demand, have inhibited accelerated coal use. On the other hand, there is now mandatory switching from oil and natural gas to coal in existing power plants, and mandatory construction of new boilers with coal burning capability, actions resolved under the 1974 Energy Supply and Environmental Coordination Act. (There is legislation now being considered by Congress to extend these requirements.) Coal use could accelerate considerably under a new policy climate, including implementation of the new federal coal leasing policy program, discussed shortly.

A recent study for the Council on Environmental Quality showed that by the year 2000, as much as 35 percent of our total energy needs may be satisfied by coal -- a six- to seven-fold increase over present levels of coal consumption. (This includes optimistic assumptions about coal synthetics.)

Such a major shift to coal portends potentially significant health and ecological consequences. If coal does prove to be the "swing" fuel for the remainder of the century, we must improve our understanding of its adverse effects and develop methods for controlling them. And, if a major swing toward coal is inevitable, it gives added impetus to the need for conservation, to buy the time to accomplish the environmental research essential to its acceptable use.

Some Regional Implications

The Energy Policy Project did not attempt to "regionalize" its demand and supply calculations. The following are some general observations on the more obvious implications of the Project's findings as they relate to coal and petroleum, and considering events subsequent to the EPP final report.

Oil and Gas

If the Energy Policy Project's projections prove correct -- that we can reverse the trend of decreasing domestic oil production and improve our natural gas posture -- those regions most dependent on oil imports should benefit. They would be less vulnerable to any future embargo and to the extent that domestic prices are lower than imports they will gain economically.

The environmental impact benefits could also be significant. Postponing development of the frontier offshore areas would allow more time to plan for and accommodate the impacts that exploration and production operations will bring. This includes implementing better controls for safe offshore operations and onshore activities. These impacts are likely to be the most severe in Alaska. Operating conditions there are perhaps the worst in the world. The onshore environment is pristine, and most areas lack even a rudimentary infrastructure. Operations are likely to cut a significant swath on the landscape.

Present policy, however, dictates that there will not be a "go-slow" approach taken for Outer Continental Shelf (OCS) oil and gas. The Interior Department, responding to pressure to relieve some of the dependence on imported petroleum, is implementing a greatly accelerated OCS leasing program. Over the next three years, lands will be leased in all frontier areas,

including nine lease sales in Alaskan waters. Alaska, Southern California, and the Atlantic Coast, will bear the brunt of these activities.

One irony of the accelerated production of Alaskan oil is that with completion of the Trans-Alaska Pipeline, and with the combined output of California and Alaskan OCS production, coupled with reduced energy demand growth, the West Coast could find itself in a petroleum surplus situation. Movement of that surplus to midwestern and eastern markets may then become a policy imperative. If this is likely to be the case, it also seems to make little sense to require mandatory equipment for coal use in west coast utilities.

Coal

With the nuclear uncertainties and mandatory switching away from oil and natural gas in large boilers, coal may be called on as the major utility fuel for some years to come. The Energy Policy Project's findings about the potential for electrical use conservation indicate that such conservation could make this a more gradual transition. But even the doubling or tripling of coal production projected in the EPP supply scenarios would carry enormous regional impacts.

Federal leasing policy is likely to be a major determinant in future coal policies. With half the nation's coal resources under Federal control in the West, a policy which makes this coal readily available would encourage a shift of national coal production from Appalachia and the mid-west to the more arid western coal lands. Already, more than 20 billion tons of federal coal are committed to the private sector. The Interior Department recently announced a new leasing policy which is a significant improvement over past practices. Leasing is to be selective and under competitive bidding only,

and subject to land use and environmental assessments. New reclamation standards will be imposed on all federal coal. Measures are included to assure development of existing leases. If this program is fully implemented and firmly administered, it could go a long way to assuring a more satisfactory exploitation of the coal resource.

But much more is involved than extraction of the coal. Potential regional impacts, now being commonly debated, will be influenced by where and how coal is burned, whether it is used for synthetics production, with huge consumptive water demand, and associated impacts on communities. The environmental, economic, and social impact aspects of western coal are the subject of intensive study by the Council on Environmental Quality.

There are, of course, many additional regional implications of a national energy policy, but these are beyond the scope of this discussion. I close by again emphasizing the Energy Policy Project's point that the major benefit of conservation is that it provides greater supply flexibility, more time to assure that the resource development job is done right, and that regional effects are better accommodated.

THE VIEW FROM MINNESOTA: A STATE IN THE MIDDLE

By Philip W. Gerts, Esq.

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Minnesota Energy Agency

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Dayton, Herman and Graham
Minneapolis, Minnesota

I am going to begin with an act which typifies lawyers--for better or worse. I immediately offer two disclaimers. One, I am no longer a member of the staff of the Minnesota Energy Agency, and the views I share with you this afternoon are wholly my own, although they have been greatly shaped by my bureaucratic tenure. Secondly, and more importantly, I stand before you as a lawyer, not a scientist. My remarks, therefore, will be short on technological information and expertise. Rather, I want to concentrate on certain "institutional" aspects of our energy crisis and present two ideas which some of you may find uncomfortable. First, the states have a vital and necessary role in establishing regional and national energy policies, and secondly, many of our most puzzling and critical energy problems will not be solved by searching for more fuel.

All of my remarks are premised on a single, critical assumption: that we will never again have enough energy. I am convinced that expenditures of even infinite sums of money cannot purchase enough energy to meet our future needs. We must, therefore, assume that the goal for the future is learning how to cope with limitations on our energy supplies, how to maintain economic health without

unnecessary demand upon our energy supplies, and how we can supply energy for important and vital needs. The role of energy planning, whether done by a single state such as Minnesota, a regional group such as the Western States Regional Energy Policy Office, or the federal government, must face these same problems and these same challenges.

While Minnesota's energy problems are hardly unique, the state faces a combination of issues that will tax to the utmost its ability to plan and direct its own future. Minnesota's most obvious difficulty is the fact that it has no fuel supply within its own borders. Save for an insignificant amount of hydroelectric power, Minnesota imports all of its energy. As long as the present mixture of federal and state regulation of petroleum and natural gas supplies persists, Minnesota must depend upon the regulatory policies of other states and the federal government for its energy.

Petroleum presents an especially vexing problem. Minnesota depends on Canada for 60 percent of its petroleum, or almost 25 percent of its entire energy needs. As many of you are undoubtedly aware, the Canadian government has announced a plan to first reduce and then eliminate petroleum exports to the United States. Even though recent negotiations between the United States and Canada have persuaded the Canadians to maintain supplies to Upper-Midwest refineries until the last possible moment, Minnesota ultimately faces loss of a substantial portion of its energy supplies at a time when it is unclear where replacement supplies will be obtained.

Finally, Minnesota has a third and acute problem created by the nonsubstitutability of certain fuels. For example, the mining industry uses enormous amounts of natural gas to refine low-grade iron ore--known as taconite--into high-concentrate pellets suitable for steel-making. With present technology, natural gas is the only fuel possessing sufficient Btu content for the taconite concentration process. Thus, the economic backbone of northern Minnesota depends upon a single fuel whose future availability is at best uncertain. On a smaller scale, the dairy industry requires natural gas to manufacture powdered milk; petroleum lends an offensive odor that renders the powdered milk unusable. And of course, the entire agriculture industry depends on petroleum to run its tractors and other farm machinery. Whatever promise electrified mass transit may hold for large cities, rural Minnesota is still tied to the internal combustion engine.

In addition to the direct problems created by short supplies, Minnesota faces a number of secondary problems. Minnesota lies between western sources of energy, such as Northern Great Plains coal, hydroelectricity, North Slope oil, and North Slope natural gas on the one hand, and eastern consumption centers on the other. Somehow, this energy must cross Minnesota to reach markets in and around Chicago, Milwaukee, Detroit, and other large metropolitan areas. Thus, Minnesota in the next thirty years will see the construction of numerous new power lines. It will be crossed by unit trains carrying many tons of coal. One or two new pipelines are likely. And of course, numerous new power plants will be built to

serve the needs of both Minnesota and its eastern neighbors. Thus, it is these problems which gave this talk its name: "Minnesota, a State in the Middle."

The production and transportation of energy will place heavy demands on two of Minnesota's most abundant and precious resources, its land and its water. Large amounts of land will be needed for power line corridors. In the next five years alone, 4 or 5 power lines will be built to serve only Minnesota's energy needs. There is no certain way of telling how many more lines will be needed to carry energy across and from Minnesota to other states. Similarly, hundreds, it not thousands, of acres will be needed to construct new power plants. And finally, large areas of northern Minnesota may be required for peat production if gasification of this lowly plant proves to be feasible.

Minnesota's water resources are under similar pressure. Huge amounts of water are needed for cooling in both conventional power plants and in nuclear reactors. This water is required not only in Minnesota, but in other states. Moreover, the gasification of coal requires much water for the production of steam.

Finally, there are other non-energy pressures on these resources. Food production will place huge demands on both, and the need for human living space--particularly in fast-growing suburbs--will exacerbate the land use conflict. The water supply problem is perhaps more acute in western states where there is less water, but as this water is used, Minnesota's abundant supplies will become more valuable. And finally, the need to preserve the environment, to maintain Minnesota's precious wilderness areas and to preserve its unique lakes and

rivers, also limits the amount of land and water available for energy production.

This brief resume has not been intended to demonstrate that Minnesota's energy problems are unique or unusually complex, for essentially these same difficulties face every one of the fifty states. What I have hoped to demonstrate is the often-ignored truth that Minnesota--and all other states--faces many serious energy problems that can only be solved at the state or regional level.

I once had the opportunity to ask a member of the U. S. Congress, who is thought to be quite knowledgeable in energy matters, what role he perceived for the states in meeting the energy crisis. To my astonishment and dismay, he answered "None." The states lack the financial resources, he explained, to fund the search for new energy technologies. It was evident from this answer, and from other statements he made, that this Congressman regarded the energy crisis as a solely technological problem that could be solved if sufficient resources could be devoted to basic and applied research.

Those remarks were made in the spring of 1974, but in the intervening two years, our energy problems are still perceived to be mainly technological. From attempts to wrest energy from the atom, to learning how to produce methane from barnyard droppings, to gasifying a strange, water-logged plant called peat, most efforts to "solve" the energy crisis are part of a vast search for new machines or new processes or new fuels. Or we search for ways to dampen the energy appetite of our present society. News-

papers are being recycled for insulation; everyone will soon know how inefficiently his or her car converts energy into motion; and automatic ice-makers will have assumed the notorious status of the Puritans' scarlet "A."

Such efforts are not unimportant; indeed, the drive for conservation is critical. Nevertheless, the technological fixation of the Congressman and many others obscures equally important--and more immediate--questions of resource management, land use control, and end use regulation. Regardless of the technical innovations achieved in the next twenty years, all states must resolve competing demands upon all their natural resources; choose whether to allocate land for housing, food, or energy; and decide who will have enough energy and who will not. For Minnesota and the Upper Midwest, no revolutionary energy technology will be invented soon enough to avoid natural gas shortages. No new technology has been proposed that does not require enormous amounts of land. And the two most promising energy resources for the future--coal and the atom--will require enormous amounts of water.

These questions are made more difficult because the answer to each implies greater government control. The government will decide who gets the gas, where the next power plant will be built, and who can mine the coal. The increasing role of government in dealing with energy problems raises many fundamental questions about the future of our economic and social organization. Yet the emotional content of any debate on these questions inevitably obscures the substance.

In an effort to eliminate emotion and focus on substance, the seminar sponsored by the Ford Foundation and the AAAS in Minnesota was designed to involve legislators, government regulators, energy suppliers, energy users, and members of the public in an informal discussion of energy end use regulation. For the purposes of that conference, "regulation" was defined as the process of setting prices and allocating supplies or services according to decisions made or influenced by government institutions. Included in this definition were direct regulation of supply, akin to rationing or the present allocation program, price regulation, and indirect regulation such as tax incentives or government subsidies. As our first discussions proved, end use regulation is a topic which is endlessly and uselessly confusing. The phrase immediately conjures images of a sprawling and complex bureaucracy populated by small-minded bureaucrats making decisions with enormous impact but with no necessary relation to reality. Speaking the phrase "end use regulations" immediately divides all within earshot into ardent proponents or scoffing opponents.

Despite these initial responses, most participants concluded that regulation is neither inherently good nor inherently bad. If regulation achieves our social and economic goals, it is "good." If it frustrates those goals, it is "bad."

Similarly, there is no inherent virtue in a "free" market place, that is, one without regulation. If that market allocates goods and services to serve society's goals, it is "good;" if those goals are not served, the market is "bad."

Historically, this country has given the market place the first opportunity to serve society's goals, but where the market place has failed--or at least has been perceived to have failed--some kind of regulation has been imposed. Railroads, motor carriers, airline operations, stock markets, and natural gas production are but a few examples. Unhappily, none of these past experiences provides much inspiration for the future.

Yet once the conference participants discarded the familiar rubric that end use regulation is "bad" and the free market is "good," all were willing to grapple with the central question of whether our present assortment of government regulators and free marketers can respond to and ameliorate the energy shortages predicted for the next ten years and longer.

As the conference discovered, we must first identify our goals and priorities concerning allocation of available energy supplies. Several can be stated easily: avoid economic disruption, allocate supplies fairly, avoid undue penalties against any single producing or consuming sector, such as the poor, maintain reasonable levels of employment, avoid regional shortages of particular fuels, and so on.

The answers become more difficult as the questions become more specific. If fuel oil is in short supply, should available supplies go to rural farmers who have no alternate supply or go to urban hospitals and schools? As natural gas shortages grow more severe, should available supplies go to homeowners, the taconite industry, or for the production of anhydrous ammonia?

The first step in the debate over end use regulation will be--and must be--a profound discussion of priorities and objectives,

uncluttered by the participants' feelings about the past success or failure of government regulation. Most persons can agree on the broad objectives of a state or national energy policy. It is the next step--consideration of specific regulatory mechanisms--upon which most people trip. Although there are exceptions, past and present regulatory mechanisms have not functioned well, particularly at the federal level. Most people assume that past experiences with government regulation represent all possible experiences. Such a reaction, however, ignores the causes of regulatory decay and immediately cripples any effort to learn from the past.

Regulation has failed most often because the goals of regulation have become uncoupled from the regulatory mechanism as time passes. The reasons which compelled the formation of the Interstate Commerce Commission in 1889 do not support railroad regulation in today's economy. Similarly, considerations which may have supported regulation of the motor carrier industry in 1935 are no longer valid. Mr. Justice Douglas--a former head of the Securities Exchange Commission--urged that all regulatory agencies have a finite and specific useful life. He suggested a span of thirty years. His point is not the simplistic notion that all regulatory agencies should self-destruct, but that the nature and duration of the regulatory instrument should be consistent with the reasons for creating the mechanism in the first place.

Any regulation of energy supply and end use must adhere to its mothering purpose. The most glaring example is the price regulation of natural gas. Whatever reasoning prompted such control twenty-five years ago is today painfully obsolete--but the FPC still sets

interstate rates. A second instance is the federal petroleum allocation program, which was established to meet the many short term problems created by the Arab oil embargo. The embargo ended over two years ago, and yet that regulatory scheme has acquired a life of its own and refuses to die.

Although the lessons of the past are not promising, I am optimistic that we can devise the governmental and institutional tools to meet the complex challenges of our energy future. The success of these efforts will depend heavily on the vitality of the role played by state government and our willingness to tackle the institutional problems posed by an energy-scarce future. The present energy crisis is as much a crisis of short-sightedness as a crisis of short supply. While our tanks may never again be full, we can, I hope, look to the future without squinting.

Thank you.

ENERGY, WATER AND THE WEST

Eileen Grevey

New Mexico Energy Resources Board

Santa Fe, New Mexico

In presenting this paper, I am unable to claim either credentials or experience as a technical water expert. In fact, what I do claim, in approaching the task before me, is a healthy fear, that left unattended to dive into the "Law of the River," I might well sink! Therefore, I approach the topic of water, energy and the west, not as a water lawyer, scientist or technician. Instead, I am speaking as a concerned citizen, who realizes, albeit in simplistic fashion, that the decisions of today concerning water resource management could well determine the welfare of the West tomorrow.

We are all aware of the critical energy situation now facing this country:

- Domestic oil production is currently more than one million barrels per day less than it was at the beginning of the OPEC oil embargo;
- Natural gas production peaked in 1973 and has been declining ever since;
- Coal production is presently only at the level of the '40's;
- More than one-half of all new coal and nuclear power plants

scheduled to go on line in 1985 have been delayed or cancelled;

- Legislation to promote the commercialization of synthetic fuel has been held up in Congress for over a year;
- Efforts in solar and geothermal energy are going ahead, but cannot make massive contributions for some time; and
- Meanwhile, we have been increasing our dependence on foreign oil imports, acknowledging, in lemming-like fashion, that such a course has very damaging foreign and economic policy implications for the future of this country as a world power.

We all realize that these trends must be reversed. Even with a serious national commitment to energy conservation, America must accelerate the development of her domestic energy resources.

We in the West realize that, at least in the short run, the country will turn to us for most of this development. President Ford, in his State of the Union Message in 1975, set a goal that by 1985, coal production must be doubled to 1.2 billion tons per year.[1] Achievement of this objective means the opening of at least 250 new mines west of the Mississippi, where 70 percent of the nation's low sulphur coal lies.

Recent projections from the Energy Research and Development Administration (ERDA) show a reliance on nuclear energy for the generation of 40 percent of our electricity supply by 1990. Over half of the nation's production of uranium ore, the fuel source for nuclear power plants, now comes from my own state of New Mexico.[2] Surely the Rocky Mountain West, with the richest deposits of uranium, can expect enormous pressures to increase production levels if the ERDA projection is pursued.

The West is committed to help the nation meet its energy needs.

At the same time, we are very concerned that this development occur in a manner which is in the best interests, economically and environmentally, of our citizens. We are similarly determined that in making the transition to becoming "the Energy Breadbasket" of the nation, we not lose control of our cherished Western way of life.

One unpleasant, yet terribly salient fact which intensifies all of our concerns in the West is this: While we are energy-rich, we are water-poor.

While studies tell us that today there is water available to meet most of the needs of the West (although the increasing number of Indian water rights claims show even that is disputable), we do know that if the western states develop their energy resources to meet the aspirations of the federal government, the decisions we make today will be critical for charting the course we'll be destined to travel tomorrow.[3]

For example, consider these federal water-for-energy projections: In 1965, the total amount of national consumptive water use was 80 billion gallons a day, of which two billion was utilized in the production of energy. The National Water Resources Council now predicts that by the year 2000, this amount will increase to 14 billion gallons per day -- a sevenfold increase in 35 years.[4]

Much of this increased consumption can be expected to come from Western water supplies. Water is, at present, an essential element in all phases of energy development: exploration, extraction, processing, conversion, transportation and rehabilitation.

Perhaps the imminent demand for more water for energy would not seem so ominous if the consumptive levels of other traditional water uses were

to remain static. Unfortunately, we cannot expect this to be the case. The last Bureau of Census projections based on assumptions of Zero Population Growth (ZPG) indicate that through the year 2000, the population of those 11 states most commonly grouped together in western water studies, will increase at a rate more than double that of the rest of the nation.[5] It is thus obvious that energy will not be the only sector requiring increased water consumption over the levels of previous years.

Even without the energy crisis and a normal population growth rate, Western water resource management would not be an easy task for it is governed by a multitude of laws, regulations, compacts, and international treaties. The court dockets of the West prove there are as many interpretations of Western water law as there are laws themselves. Institutional, cultural and environmental considerations further complicate the water picture.

We have travelled quite a distance in time and complexity from the old doctrine of 1st in time, 1st in right. The applicable portions of the "Law of the River" for my own state, New Mexico, include the following:[6]

the Winter's Doctrine of 1908

the Colorado River Compact of 1922

the Boulder Canyon Act of 1928

the Mexican Water Treaty of 1944

the Upper Colorado River Compact of 1948

the Supreme Court Decree of 1964 in Arizona vs. California

the Colorado River Storage Project Act of 1965

the Colorado River Basin Act of 1968

the National Environmental Policy Act of 1969

the Federal Water Pollution Controls Act of 1972

the Colorado River Basin Salinity Act of 1974

The above is hardly meant to be all-inclusive; it is merely representative. It should not be difficult to imagine the possibility that somewhere, among all the statutes and judicial decisions, there is room for differing opinions between the states, the federal government, the Indians, and other groups as to the true meaning and intent of the various authors of this great body of law. The energy crisis has made this possibility a virtual certainty, as all the aforementioned entities become potential competitors for the same scarce resource.

The western states have traditionally been very protective of their powers relating to water rights. These include the authority to determine priorities on the beneficial use of water, to join in interstate compacts which apportion the water of interstate streams among states and to create laws and regulations, in areas such as water quality control, power plant siting, and mining reclamation, which will serve what they consider to be the best interests of the states.

The concept of applicability of state water quality laws on federal lands covered by federal water quality laws, has usually been worked out to the general satisfaction of both the state and federal agencies involved. Foremost of those concerns that hang as a spectre over the states, is the federal concept of federal reserved water rights. While federal officials as high ranking as Jack Horton, Assistant Secretary of Interior for Land and Water Resources, have repeatedly assured the states that the Department of the Interior does not intend to ride rough-shod over the states in this area, the anxieties have not yet been completely satisfied.[7]

Historically speaking, a relatively small amount of energy development occurred in the arid and semi-arid regions of the West. Because of this,

water was never considered as a basic factor in energy development, and as late as 1973, did not hold a position of much prominence in the assumptions of energy experts.[8]

This situation began changing around 1972. In that year, the U. S. Senate Committee on Interior and Insular Affairs published a series of transcripts from field hearings it conducted on current and projected electric power production in the Southwest. Committee members and staff found that while the vast coal reserves of the West might seem to signal a green light for construction of scores of new coal-fired power plants, there was one consideration which threatened to throw a wrench in the works -- the availability of water, or more appropriately perhaps, the lack thereof.[9]

The states, the farming industry, the Indians, and municipal users cast a wary eye at proposals which might preempt or reduce their own water diversions. Recognition by energy experts that water could become a limiting factor to projections for increased energy supplies finally set in. Colorado and Wyoming kindly informed the federal government of their desire to maintain viable agricultural sectors.[10] To do this they stated, might require placing limits on water supplies to serve the level of oil shale development set forth in the original Project Independence Blueprint. In New Mexico, concerns over sufficient availability of future flows to irrigate the 110,630 acre Navajo Indian Irrigation Project (NIIP), have probably contributed to the lack of haste with which the Tribal Council has moved on the coal gasification applications before it.[11] Despite the assurance of the State Engineer that the current requested diversions of water for the proposed synfuel plants would not endanger allotments reserved to the

Tribe for NIIP, many Navajos are still not quite convinced.[12]

As alluded to earlier, the amount of litigation involving Indian water rights claims is increasing steadily. Much of the litigation is based on the interpretation of the Winter's Doctrine.[13] Briefly stated, the court, in 1908, established that water flowing through, or adjacent to, a reservation at the time it was created was to be considered as reserved water for use by the Indians living on that reservation.

The great controversy revolves around whether the amount of water so reserved should be limited by that criteria for consumptive use established when a reservation was created, or if that amount is to be equal to whatever flow is needed at a given point in time to maintain the chosen livelihood of a reservation. George Vlassis, General Counsel of the Navajo Tribe, states that, based on their interpretation of the Winter's Doctrine, the Navajos could claim up to 13 million acre feet annually within the next two years in court. While the 200-odd reservations in the western states comprise only about 12 percent of the land mass and 1 percent of the population, the importance of the Indian water resource problem is far greater than the population or land mass statistics would indicate.

In general, what appears to be the biggest problem involving water for energy use is not so much the physical scarcity of the water, as how that which is available is to be allocated. If water is already committed to one use, can and will government legally preempt that use and divert it elsewhere? And if so, what about the socio-economic impact of such a use transference? Who will bear the cost of this impact?

It seems safe to ascertain that the demand for greater exploitation of western energy reserves will only increase as the time goes by. With the need for water that such energy development will ential, it should be

no surprise that the West's agricultural sector is feeling quite threatened. The effect of rapid preemption of irrigation water could work a terrible hardship on many farming communities, who would have no ready labor options available should this occur.[14] These communities would almost surely feel a negative impact, since the secondary economic benefits of rediverting water would most likely occur far from the point where the water would be preempted.

80 percent of the surface water now used by man in the Colorado River Basin System is consumed by irrigation.[15] This figure is sure to drop as energy activities increase. In many cases, the contest between energy and agriculture will be decided on a purely economic basis -- the industry will merely offer the farmer a deal he can't refuse.

Dan Dreyfus, Deputy Staff Director of the Senate Committee on Interior and Insular Affairs, presented to a session of the Western States' Water Council the following analogy:

> If water was available at $100 per acre foot, the cost attributable to the water required by a 100,000 barrel per day oil shale plant would amount to less than 5¢ on each barrel of oil produced. The gross value of oil would be on the order of $13 per barrel in today's market. Similarly, $100 water would contribute about 2-3¢ per 1,000 cubic feet to the cost of synthetic gas worth over a dollar in unregulated commerce. It would contribute about 0.4 mills per kwh on electricity worth 20 mills or more. By contrast, most irrigated agriculture becomes marginally economical when water costs $20 per acre foot, and much of it could not afford to use water at rates well below $20. In sum,

industry may well outbid agriculture as the demand/supply picture for water forces up its price.[16]

To add another element to the Pandora's Box of legal, institutional and economic problems relating to requirements of water for energy use, let us throw in environmental considerations. For example, the salinity of the water available on the main stream of the Colorado River in the Lower Basin, is the principal water problem on the Colorado River.[17] There is a general consensus among water technicians and environmentalists alike that the Upper Basin cannot possibly increase its beneficial consumptive use without that action increasing the salinity of the water delivered to the Lower Basin. While none of the water currently diverted for use in the coal-fired electric power plants, nor that authorized for diversion for proposed coal gasification plants, is to return to the stream, the depletion of water caused in the stream from the diversion would increase the proportion of salt to water, by leaving less water to dilute the salts flowing in the river. Thus, there would be a net increase in the level of salinity in the Lower Basin. The proposed Utah Kaiparowits Power Plant has been criticized because of the chance it would follow the above pattern.

Thadis Box, Dean of Natural Resources at Utah State, feels that anticipated diversions of water for energy will seriously affect existing wildlife patterns. Dean Box is also concerned with the potential health hazards to our western drinking supplies, especially at uranium mine and mill sites, from seepage of radium, selenium and other toxic substances into these water systems.[18]

Are there any panaceas on the horizon for satisfying everyone's future water needs? As for sure-fire solutions, one can probably say with some confidence -- no. But then even if this is not Candide's "best of all possible worlds," surely there is some hope that we can at least improve upon our competing water use problem.

First, decision-makers in the West will have to educate their constituents as to the hard facts: We have reached a point where it will be absolutely necessary to optimize our water use to ensure that we are getting the highest economic return from each unit of water used. It some cases, the wisest allocation of relatively fixed water supplies may be achieved by a total laissez faire policy on the part of the government. This would leave competition for water in the market place. The economic analysis of Dr. Dreyfus would suggest that the energy industry would win, hands down, in competition with the small farmer. Larger agricultural enterprises however, would be economically capable of bidding in the same league with energy industries and could pick up the load of the small farmers, so that food production levels would not be affected, and perhaps even increased, through the economies of scale.

Besides transference of some irrigated-agriculture water rights to energy use, there are many other avenues to pursue for optimization of existing western water resources. Those states opposed to altering their traditional water priorities in order to satisfy new energy requirements, and/or where water scarcity is a real problem, might look into the possibility of exporting their energy resources for processing an area where water is more abundant.

The transportation of coal through pipelines, in the form of a slurry, entails significantly less consumptive use of water than does either the direct burning of coal in a power plant (mine-mouth generation) or conversion of coal into synthetic gas, as is proposed for coal gasification plants. Such a line is now in existence between the Black Mesa Coal Strip Mine in Arizona and the Mojave Power Plant on the Colorado River in Nevada.

Coal slurry lines not only make possible the saving of water in water scarce areas, but the water used to make the slurry mixture can be separated out at the end of the line and used for various industrial purposes.

Energy industries can also reduce their own water requirements by instituting waste water recycling techniques and other sophisticated methods of conservation. Some possibilities along these lines include dry cooling for coal-fired power plants and gas-cooled nuclear power reactors.

Weather modification, more specifically cloud seeding, has been receiving increasing serious consideration as a potential method of augmenting water supplies. The process involves increasing the amount of water precipitation by seeding moisture laden air masses that are pushed by prevailing winds over high mountain ranges. The technology is more complex than initially thought. It may require quite some time before its long term effect can be established.

Desalination has long been recognized as a means for salvaging water whose practical uses, because of the high saline concentration, would be severely limited. On July 7, 1975, the Department of the Interior issued a press release announcing plans to have the Bureau of Reclamation construct

what will be the world's largest desalting plant. The plant, which will be built near Yuma, Arizona, will hopefully improve the quality of the Colorado River water delivered to Mexico through our treaty obligations.[19]

Industries with the financial capabilities might be induced by the government to pump deeper for their water supplies. Greater efforts to assess the feasibility of better utilizing the groundwaters of the West could be made.

In some cases, facilitating the optimum use of Western water resources may necessitate large transregional diversions. This has already occurred on a smaller scale, in Colorado, where it was necessary to convey large amounts of water across the mountains to satisfy the water needs of Metropolitan Denver.

Some of the energy producing, water-poor states of the West are considering possibilities for trading some of their exported energy resources for imports or diversions of water from the energy end-users.

In semi-arid New Mexico, there have been suggestions that the state should withhold its water from the production of gas until the achievement of an agreement whereby the water used to produce the gas would be charged against the compact entitlements of those downstream states who would be consuming much of the gas.

New Mexico State Engineer, Steve E. Reynolds, has stated that while this idea might sound quite tempting, an investigation of its practicality results in less than optimistic findings. Mr. Reynolds related that to negotiate such an arrangement, one would have to amend both the Colorado River Compact of 1922 (which would necessitate legislative ratification by each of the seven Colorado River Basin States and the U.S. Congress) and the Upper

Colorado River Basin Compact of 1948 (ratification necessary from Arizona, Utah, Colorado, New Mexico and Wyoming legislatures and the U.S. Congress.) In addition, one would have to persuade California citizens, who have legal rights to Colorado River water, to be amenable to giving up some of those rights to New Mexico, so that the needs of gas consumers in California could be met.

Mr. Reynolds, a man of good wit who has had many years of experience in the water business, likes to defer to his legal advisor, Paul Bloom, for his analysis of the chances that such negotiations could be accomplished by New Mexico. Mr. Bloom's legislative opinion runs something like this: Pigs will fly before the compacts will be amended to allow New Mexico to use California water to produce gas.[20]

Since neither Mr. Reynolds nor I are attorneys, we do not have too great an understanding of the aerodynamic capabilities of pigs. Therefore, with little legal savoir-faire with which to contest Mr. Bloom's claim, we are bound to accept it.

The real answer to meeting western water needs will involve a large mix of policies, innovations, and compromises, requiring an even larger measure of cooperation between state, federal, regional, local and Indian government, and representatives of both the private sector and special interest groups. Together, all these people will have to develop a comprehensive water resource management plan which will result in the most equitable and viable allocation of western water uses possible.

The federal and state government have been addressing themselves to the development of such a plan. At the federal level, major national and regional water assessments have been underway since the commencement of National Water Assessment of 1968. Updates to this study were done in

conjunction with the 1974 Project Independence Studies and the beginning of a formal update to the 1968 assessment in 1975. In 1974, the U. S. Department of the Interior published several water for energy reports covering the major water basins of the West.[21] The studies, composed by joint federal-state management teams, were done in an attempt to identify existing multipurpose uses, including energy, of western water supplies.

In 1976, the Department of the Interior published another state-federal effort entitled "Crucial Water Problems Facing the Eleven Western States," This report was designed "...to provide reliable information to the Administration for making decisions on policy, funding and action programs for management and development of the water resources of the West."[21] Its objectives included environmental considerations, economic efficiency, total water management, augmentation of water supplies, energy resource development, conservation and reuse of water, water quality improvement and the development of Indian resources.[22]

The Water Resources Council, established by the Water Resources Planning Act of 1964 to coordinate federal, state and local water management activities, is also looking at the problems of establishing efficient-beneficial priorities for western water resources.

The states have grouped together in various manners to address western water use problems. In the beginning of November, 1975, the National Conference of State Legislatures, together with the American Association for the Advancement of Science, sponsored an "Energy, Water and the West" workshop in Albuquerque, New Mexico. Many of the issues presented herein come from papers presented at that time. The National Governor's Conference

(NGC) recently established a Natural Resources Committee Task Force on the water requirements for coal. In a cooperative response to this move, the President's Energy Resources Council established a parallel committee to interface with the Task Force of the NGC.

The Western States Water Council, comprised of 33 representatives of 11 western governors, has traditionally dealt with impact problems caused by the redistribution of water resources. The Council interacts with the federal government to try and ensure and enhance the protection of state water rights.[23]

The Governor-sponsored Federation of Rocky Mountain States and the Western Governor's Regional Energy Policy Office are addressing water for energy problems on a case-specific basis.

It would seem that there is a desire at the federal, state and local levels of government to cooperate in identifying and bringing together all their many diverse objectives. Hopefully, the result of their efforts will be a mutually beneficial, multipurpose water management program.

The energy crisis, with its resulting national goal of increased domestic production, has forced us all, particularly those of us in the Arid West, to take a good hard look at our limited water resources. It will take much courage and wisdom to achieve the optimum use of our water supplies. In 1976, our Bicentennial Year, it is a particularly appropriate challenge for the federal and state governments, for the public and private sectors. For as Benjamin Franklin said at the inception of this nation, in dealing with those problems which will confront us as a nation, either we'll all hang together, or we'll hang separately.

FOOTNOTES

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* The 11 states are: Arizona, California, Colorado, Idaho, Montana, Nevada, Oregan, Utah, Washington, Wyoming, and New Mexico.

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12. Steve E. Reynolds, New Mexico State Engineer, "New Mexico Water Resources -- Upper Colorado River System," April 3, 1975.

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COMMUNITY INVOLVEMENT IN PROBLEMS OF ENERGY AND GROWTH IN SAN DIEGO

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Compared to the rest of the nation, San Diego has an atypical end-use energy distribution pattern; over 40 percent is in transportation, and over 20 percent is used by the residential community. The remainder is split between industrial, commercial, and government users. Thus, approximately 65 percent of San Diego's end-use energy is intimately connected with the daily energy lifestyles of San Diegans. It may not be surprising, therefore, that an increasing number of concerned private citizens, as well as institutional representatives, have become involved in community oriented energy programs.

As director of the KPBS-TV Science Office*, I have the view that regional public television is a multi-faceted community resource that may be utilized in a number of non-media activities to improve communications between various groups within the San Diego community. In the past two years, the Science Office has been endeavoring to not only improve the public's understanding of science and technology, but to also help upgrade the level of public policy debates and analyses by involving the scientific community more directly in the public arena. We have brought scientists and engineers together with citizen groups and individuals

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* KPBS Science Office, now an integral part of KPBS-TV (Public Broadcasting in San Diego) was established in December, 1973 under a two-year grant from the National Science Foundation (NSF).

interested in public problems with a strong scientific or technical component. This approach has the important extra advantage that the scientists and engineers, often from the academic community, acquire "real world" exposure and a sensitivity to the non-technical components of a policy issue.

Clearly, the energy problem has created policy issues and public program ideas that make it especially appropriate for such community involvement activities. My colleague, Susan Pollock and I have, in fact, been concentrating our attention on this vital area. In early 1974, Richard Stephens, former NSF program manager for the Office of the Public Understanding of Science, suggested that I confer with AAAS representatives on the newly developing regional seminar program. The result has been a series of workshops, seminars, and forums focused on the San Diego energy picture. In the earlier meetings, a hard corps group of energy activists were identified, and a number of promising energy action program ideas were promulgated--unfortunately, no concrete action directly resulted from the earlier sessions. That is not to say that the meetings were a failure, but that the results were diffusional in nature. For example:

1. The Mayor's Office and County Board of Supervisors were made energy conscious; members and staff participated in our deliberations, but indecision and the politically unattractive nature of various energy program suggestions resulted in a bare minimum of action.
2. A County Energy Coordinator was appointed but became lost in the local government bureaucracy. Much later, a similar

position was created in the city government.

3. City energy and county energy statements were developed for incorporation into the general planning documents.
4. The local utility was encouraged to maintain an active conservation program (and has continued to do so).
5. Other energy groups became more vocal and active (A school program on energy education was initiated, a number of citizen's groups to combat high energy prices were established, and rapid transit became the subject of intense political debate).
6. A small cadre of activists were made aware that conservation is a readily available source of energy.

This may sound impressive, but it could be argued that the earlier seminars and workshops were not the primary motivation for these activities. Moreover, the degree to which energy action programs affected the basic picture of energy end-use in San Diego is best illustrated by the fact that there was only a small net slow-down in San Diego's electric energy consumption from a pre-1973 oil embargo growth rate of 7 percent per year to our current rate of 5 percent per year. The bulk of this savings, however, has not been attributed by San Diego Gas and Electric Co. (SDG&E) to the economic slow down and not to long lasting conservation efforts.

The combination of an aroused, hard corps group of public-spirited citizens and the return to energy normalcy, provided the stimulus for another attempt at catalyzing energy action programs and policy studies

via a regional energy conference in San Diego.

To make a long story short, allow me to briefly review the organizational milestones in the development of what came to be known as the San Diego Energy Policy Planning Forum. An organizing committee was established with representatives from various sectors in the energy community (See Appendix A). Notable members of the group, from a community involvement viewpoint, were Mr. Ron Frankum, Executive Director of the Urban Observatory and Mr. Mike Madigan, assistant to the Mayor and Chairman of the Urban Observatory's E-Group (E for energy). The Urban Observatory was originally funded by the Department of Housing and Urban Development to provide a bridge between technical excellence centers (at universities, etc.) and the local governmental agencies. It has since developed into a joint effort by the City of San Diego, the University of California, San Diego, and San Diego State University. It is attempting to formulate and initiate action programs in a number of areas to supplement an on-going University Research Program. One of these is in the general field of regional energy programs, referred to as the E-Group. The inclusion of Messrs. Frankum and Madigan at the early stages of Forum planning resulted in the active participation and support of the E-Group staff, so that the Urban Observatory became a co-sponsor of the Forum. This provided an institutional means by which Forum proceedings could be published and resultant follow-up activities monitored. Moreover, the Urban Observatory's commitment to become a non-profit energy information and action program center for the San Diego region could be used to

translate Forum ideas into energy action programs for San Diego.

As chairman of the organizing committee, I distributed copies of the Ford Foundation's Energy Policy Project's summary report, A Time to Choose, and some of the more detailed policy studies. Along with this, a tentative program was established, using the Energy Policy Project's conclusions and recommendations as the springboard for the proposed debate. Basically, the original concept was to convene three sessions on:

1. The current status of energy use and supply in San Diego
2. The San Diego energy future
3. Regional energy policy for San Diego

After a number of meetings, the organizing committee decided that maximum information transmission and participation could be achieved if we compressed the formats of each session so that the three areas would be covered in half-day sessions. Thus, the Forum was designed as a sequence of evening, morning, and afternoon meetings to be held 14-15 January, 1976. At this point, session chairmen were appointed by the organizing committee, with each chairman given the responsibility of making final selections for speakers and panelists, as well as conducting the actual session. I might add that invitations to attend and participate in the Forum were extended to almost 200 San Diegans. A total of 81 people actually attended. AAAS funds (from a Ford Foundation grant) off-set some of the organizational costs, but all registrants contributed a fee of $25. to cover the two dinners, proceedings, and other expenses.

The basic intent of the San Diego Energy Policy Planning Forum was to provide a means to air the background information and various viewpoints on our energy past, present, and future. These are required in order to identify both the bounds of controversy and areas of consensus for a regional energy policy. The Forum was hoped to be a significant contribution to the further development of a San Diego energy community wherein the special problem posed by the world-wide, national, and regional energy situation could be discussed and analyzed in public proceedings for the public welfare.

The speakers, panelists and participants in the San Diego Energy Policy Planning Forum included representatives from all levels of government, the local utilities, San Diego energy and transportation planners, and a number of energy managers from local institutions. It was a hectic, fast-paced series of meetings, the results of which are still being pondered by all concerned. Professor Dorothy Nelkin of Cornell University was asked to observe the sessions and make a report on the Forum approach to improving community involvement in regional energy programs. Some of her remarks are included in Appendix B. I recommend that you read them, as they provide a more detached view of the proceedings.

My impressions of what happened at the Forum are analogus to the mutterings of the airline pilot who reports some bad news and some good news to the passengers. "First the bad news...we're lost; now the good news...we're making good time!"

So, first let me relate some of the "bad news." It was clearly established in the sessions that recent national energy policy decisions

by the President, ERDA, and the Congress are not received as final, definitive statements of a coherent energy strategy. At the state level, California energy policy is still being formulated and will not be made public until January, 1977 when the California Energy Commission is required to submit state energy plans and guidelines. Presently, California's energy policy is a pragmatic blend of short-term programs developed by the California Energy Commission and the Public Utilities Commission. Locally, there is no identifiable governmental policy on energy (conservation or supply), other than low-key efforts to provide conservation in city and county activities and facilities.

The participating federal and state agencies' representatives concurred that regional energy programs must be part of national and state efforts, but they were not able to identify recommended guidelines, funds, or other means of support for such efforts. Thus, the indecision at the federal and state energy policy-making levels is reflected in the lip-service type of support given to regional or local energy action projects. Although there is stated interest in regions, the proof will be in the financial pudding.

From a policy viewpoint, therefore, we are"lost." That's not all the bad news concerning the Forum, but allow me to break some of the good news. It was quite evident that the Forum brought together for the first time, many people from the San Diego energy policy, planning, and user communities. This had the rewarding effect that participants were able to identify with an impartial, energy-oriented citizens group that shared a common interest in regional energy problems. Many of the participants met people, who up until the Forum, had been just a voice at

at the other end of the telephone line.

The information exchange at the Forum was also impressive. The program was geared to provide updates on energy projects and studies at the national, state, and regional levels of energy action. Transcripts of the presentations and the discussions are currently being edited by session chairmen and the San Diego Urban Observatory. They will be published in the proceedings of the Forum.

It was clear that smaller energy action groups had coalesced during the sessions. In terms of energy policy recommendations and action programs -- teams of four to eight individuals are able to agree on project objectives and activities, without the cumbersome requirements of formal membership in a larger group. Thus, it was a consensus of the participants that the Forum should continue with its objective being to provide a public meeting place for the open discussion of energy policy suggestions and action programs that affect San Diego. It could also provide leadership, coordination and administrative support to pilot projects as they develop, and make arrangements for group presentations to specific audiences (e.g., the City Council, etc.). The Urban Observatory has agreed to make the Forum a part of its E-Group program plan. This acknowledgement that small, action-oriented groups are the strength of San Diego's regional energy action programs should be stressed as a concept that could be appropriate to other communities.

Examples of activities that have been initiated as a consequence (either partial or total) of the Forum gathering are:

*The lack of solar energy utilization at school and governmental

facilities is being investigated by a group that includes an architect, an energy manager, a solar energy manufacturer, and a concerned citizen-environmentalist. This group will present their results and recommendations to local school boards and government officials.

*A group of energy managers from local government and major institutions has developed a means of sharing technical information and ideas for conservation program implementation.

*Planners and participants in the development of city and county plans for energy conservation and growth have incorporated ideas presented and/or discussed at the Forum in their policy/plan recommendations to local government.

*A small group of energy activists, with the participation of SDG&E is exploring the possibility of a new energy budget service to be provided by the local utility. This could result in a pilot program to evaluate the feasibility and effectiveness of providing the public with updated information on their total energy utilization each month.

There were other activities, and new "action teams" are forming as the San Diego energy community undergoes what may be referred to as a nucleation process. I should also add that we plan to dedicate a significant part of the KPBS-TV Science Office spring programming to the question of energy growth in San Diego and the debate over the Nuclear Safeguards Initiative.

It would not be entirely appropriate to end this paper on the encouraging notes struck by some of these results. We had a number of problems in the organization, execution, and follow-up to the Forum.

A number of these are covered in the appended note by Professor Dorothy Nelkin.

The entire energy community was not truly represented at the meetings. Specifically, it proved difficult to obtain participation by members of the anti-high energy price citizens groups, the environmentalists' community, the Coastal Commission, and the banking community. Minority groups and the poor were under-represented. The reasons vary in each case, but these deficiencies must be overcome if the words "public" and "open" are to have real meaning to the Energy Forum.

Our formats were geared too much towards information, not leaving enough time for discussion of the many intriguing ideas and concepts introduced at the sessions. A number of striking examples come to mind. Is there a conflict of interest between the state licensing private utilities to produce electric power and to provide natural gas, on the one hand; and requiring them to promote energy conservation on the other? The relationship between energy growth and economic growth was not definitively discussed; even though SDG&E representatives made it exceedingly clear that the basis of their long-term energy planning is to provide for economic and population expansion, as well as per capita increases in energy consumption. By providing for such growth, with or without stringent conservation requirements, are we in fact <u>forcing</u> growth? Perhaps most important to San Diego is personal transportation. Although many suggestions were introduced, the lack of discussion and significant follow-up activity in this area (that accounts for over 40 percent of energy end-use) was indicative that the participants, like the general western public, are unable to "feel comfortable" with a life style change

that takes them out of their automobiles.

While there was general agreement that a Forum activity should be continued, the larger group was not able to agree on energy action programs or concrete energy policy statements. I do not interpret this as a negative result, but as a definite indication that at the present time, community energy action programs in San Diego can best be initiated and conducted by smaller, goal-oriented groups. If there was an implicit consensus at the Forum, it was that such groups can out-perform a large, ad hoc ensemble.

Thus, the San Diego Regional Energy Forum's primary objective, now, is to provide the environment and interested resource people for such groups to work and get their message to both the public and decision makers. There are many unanswered questions about the ideal or optimum space/time path for the Energy Forum and its related activities, but the concept is developing into a workable means of providing the interested public and technical communities an outlet for participation in regional energy policy planning.

APPENDIX A

San Diego Energy Policy Forum -- Organizing Committee

Chairman -

Dr. Jeffrey W. Kirsch, KPBS Science Office

Members -

Mr. Kenneth Brunot -- West Coast Project Officer, National Science Foundation

Mr. Ron Frankum -- Executive Director, San Diego Urban Observatory

Dr. John Howe -- UCSD Energy Center

Dr. Paul Hurley -- Naval Undersea Center

Mr. Larry Icerman -- UCSD Energy Center

Mr. Mike Madigan -- Assistant to the Mayor of San Diego

Dr. Alan D. Pasternak -- Commissioner, California Energy Resources, Conservation, and Development Commission

Mr. William Pettus -- Energy Management Coordinator, UCSD

APPENDIX B

Excerpts from a critical review of the Forum by Professor Dorothy Nelkin (Cornell University), submitted 19 January 1976 (Professor Nelkin's complete review will be published in the Forum proceedings and is also available from the KPBS Science Office)

The San Diego Energy Policy Planning Forum brought together members of the "energy community" in the San Diego region to air national and local energy problems and to discuss the potential for developing a coordinated regional policy. The goal was to stimulate a long-term regional energy action program and to explore possible institutional forms through which coordinated energy policy and priorities could be mediated.

The Energy Community

Both participants (speakers and panelists) and invitees represented groups defined as "the energy community" -- that is, people who were primarily responsible for energy supply and regulation, or those in positions permitting them to initiate conservation measures. Thus, participants included: 7 people from city and county government or related departments, 2 from the Navy, 8 representing federal or state agencies, 3 representing the local utility (SDG&E) and 7 academics. Invitees included about 5 from city and county government, 12 academics, 27 from local industry including the Navy and several consulting firms, 11 from city or county planning departments, 8 from the utility, 7 from state and federal agencies, and 5 from environmental or citizen groups

and local professional societies (3 of these were from a solar energy group apparently with marketing interests).

There were several conspicuous absences if one were to identify a community of people very directly affected by and affecting energy policy; the financial community whose financing policies directly determine energy demand, and labor with its strong stake in continued development with its implications for energy demand. There were no representatives from the Coastal Commission despite its leverage over siting of new energy facilities. Finally, citizens groups were not well represented except for a solar energy group; nor did those attending participate -- somewhat surprising considering their activities in the area. There is in San Diego, for example, an active concern with nuclear power plant siting and a forthcoming statewide referendum that would restrict the construction of nuclear plants pending full-scale safety testing and approval by two-thirds of the state legislature. Discussion with citizen-group representatives suggested that they felt that the forum provided them insufficient opportunity to participate --"It is not a group that will listen because they regard environmental concerns as foot-dragging." "There was insufficient time to respond during the discussion." "Since the detailed program was not available in advance, and no environmentalists were speakers or panelists, we could not prepare our position." In fact, the conference chairman encouraged the Sierra Club representative to respond but he did not.

The definition of the "energy community" assured a great deal of consensus at the forum, but it precluded dealing with some of the value conflicts that this evaluator feels must be eventually considered

and aired if an effective local action program is to be implemented.

The Function and Faults of the Forum

The San Diego Energy Policy Forum was useful in bringing together people in key city and county positions who had clearly never sat down and listened to each other, despite the related character of their activities. The discussion served the important purpose of information, education and "consciousness raising." It placed a complex and fragmented picture into a total perspective, and seeded a number of ideas and possibilities which could eventually develop into specific policies and activities if the sponsors follow up the forum in a number of ways. They intend to publish and distribute proceedings, to prepare a TV report, and to send a special report to city government. In addition, it would be useful to cull from the proceedings a list of specific and concrete proposals for policy and institutional changes and their objectives (e.g., Energy Impact Statements, social management taxes to stimulate high-occupancy vehicle use, car pools, incentive tax breaks for solar alternatives, a regional energy board responsible for monitoring new developments and for coordinating energy-related activities, etc.). Once listed, it is necessary to propose means to implement these ideas and to systematically assess their own impacts, for policies as well as technologies have impacts that may be unanticipated and unintended. In this respect, more careful attention must be paid to the economic and employment effects of energy policy in future discussions.

One of the original goals of the forum was to pin down "points of contention." This was not fulfilled, yet remains important if the

intended coordination of activities is to be effective. In some areas there is consensus -- e.g., that school construction programs should be built with consideration of energy use. And everyone agreed that some policies must be developed and "action taken." But the apparent consensus at the meeting concerning proposals such as transportation alternatives, car pooling, incentive taxes, and more stringent building codes seemed to this observer more politeness than accord. The idea of car pools was mentioned and lauded again and again, but no one raised the fact that to date numerous efforts to organize car pooling in San Diego had failed -- and that attitudes were such that individuals' commuting rights in San Diego are regarded as a form of personal liberty and that single occupancy vehicles prevail. No one suggested that implementation of energy-saving proposals are bound to be extremely contentious if they interfere with the environmental ethos, industrial efficiency, the cost concerns of developers, or the autonomy of individuals. Neglect of these problems in part was a consequence of the effort to be comprehensive and informative. Also, for political reasons, the forum tried to include representatives and information from <u>every</u> agency. As a result, sessions were way overbooked. There was insufficient time for questions or discussion and the chairmen themselves were not inclined to raise difficult questions. Thus, those few questions that were raised tended to focus on technical details: "What will x cost?" "How is it designed?" The energy problem, however, is not only a technical or scientific issue in which consensus based on "truth" can ultimately be reached. It is also a political issue requiring negotiation and compromise among conflicting and often irreconcilable

interests. Thus, in the future, difficult areas of political and social conflict in San Diego must be more directly confronted and aired if indeed effective energy action programs are to be implemented.

PROSPECTS FOR INTERREGIONAL COOPERATION IN ENERGY POLICY PLANNING

Donald E. Cunningham

Senior Research Scientist

Denver Research Institute

When I was requested to prepare this talk there was still hope that a national energy policy might emerge--one with clearly stated reconcilable objectives. Had such a policy come about, this talk would have taken an entirely different form that its present one. For now, interregional cooperation must depend on voluntary arrangements that seek to reconcile frequently conflicting goals. In any situation like this, the prospects for success are slight.

I would like to consider the following several questions and come to some conclusions as to how best we can deal with our energy problems on a regional, or interregional basis.

1) What constitutes a region?
2) What "machinery" (that is, organizations) already exist?
3) How much time do we have to plan?
4) Are our expressed national goals (Project Independence, etc.) realistic? -- and do they make sense?
5) As a nation, what experience do we have in dealing with "energy

type" problems?

6) What ways and means exist to get us from here to where we want to be?

While these questions are considered, the context and title of this paper, "Prospects for Interregional Cooperation in Energy Policy Planning," should be borne in mind.

WHAT IS A REGION?

For the sake of brevity, in this paper I will consider only the Rocky Mountain Region. Immediately, the question arises as to what states this includes. Is Idaho in or out? It's out according to Federal Regions. Nebraska, however, would be in by the same definition. In order to proceed from the mire of definitions, let us assume there is a generally accepted group of states that people would think of if you said "Rocky Mountains." Surely most of the following would come to mind--Montana, Wyoming, Utah, Colorado, New Mexico and Arizona. On what basis, then, did we decide that this is a region? I will refer to several quotes from The Rocky Mountain Region: A Unity of Interests:[1]

> The Rocky Mountain states contain abundant stores of natural resources, including nearly half the nation's energy potential--extensive forests, a great potential for irrigated agriculture, and rich deposits of copper, lead, gold, silver and molybdenum. The region's magnificent landscapes and unique landforms afford unlimited recreational and scenic resources. Large-scale and rapid development of these resources--especially the energy minerals--is imminent and certain to have a profound impact on the environment, economy and quality of life of the entire area.

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[1] The Rocky Mountain Region: A Unity of Interests, Federation of Rocky Mountain States, 1975.

> Each of the states has four basic industries: mining, agriculture, tourism and public employment. The ranking of these four industries varies from state to state, but they constitute the bulk of economic activity in the Rocky Mountain West.
>
> The region's political systems are characterized by active state executive branches with comparatively small and less active legislatures. The region has the lowest average number of bills introduced (not quite a third of the national average), the fewest bills passed, the shortest length of legislative session and the lowest legislative compensation of any other region in the nation.
>
> The Federal government is the major landowner in the Rocky Mountain states, controlling 43 percent of the land. The portion of federally controlled land ranges from 86.5 percent in Nevada to about 30 percent in Montana. One effect of this ownership pattern is that the region's population taxes itself at 7 percent above the national average to provide state and local services. At the same time the states are dependent on the federal government for highways, management of public lands and other services.

This is one way of looking at the situation. There are other ways. One involves using analyses of energy flow--in this case a report from the Los Alamos Scientific Laboratory.[2] I recommend it, although will not defend the data presented point by point. I am attaching flow diagrams on Colorado, Montana, and Utah, which show that there are vast differences in energy use and generation patterns between the three states. Table I is a limited analysis of the use of production patterns for the eight states analyzed by the Los Alamos group. Table II[3] shows legislative voting patterns for the same states in 1975. Again, the patterns among those states differ significantly and though I cannot argue that the states "vote" their pocketbooks and not their demography, I am strongly inferring it.

What does all this say about regional cooperation--not to mention inter-regional cooperation? As you have heard today, these are difficult to achieve, and I would suggest that data like the above gives some clues as to why.

It would appear that state governments are not the vehicle for regional cooperation.

WHAT "MACHINERY" (i.e., ORGANIZATIONS) ALREADY EXIST?

Again, confining myself to the Rocky Mountain West, the answer to this second question is that there are several organizations -- to my knowledge, none views its function as being that of a focus for interregional cooperation in policy planning. Some of these organizations are:

The Old West Regional Commission-(Nebraska, North Dakota, South Dakota, Wyoming, Montana) A regional economic development commission established under the Public Works and Economic Development Act of 1965--activated in 1972.

The Four Corners Regional Commission-(Colorado, Utah, New Mexico, Arizona) A regional economic development commission established under the Public Works and Economic Development Act of 1965.

The Western Governors Regional Energy Policy Office-(The states comprising both groups above plus Nevada) Established April 1975 with funding from the Old West and Four Corner Commissions.

The Federation of Rocky Mountain States-(Colorado, Wyoming, Montana, Utah and New Mexico) A private non-profit corporation directed by the governors of these states.

The various Federal Agencies and the Federal Regional Council-Federal Region VIII (Montana, Wyoming, North Dakota, South Dakota, Utah and Colorado).

The various University based Policy Analysis Groups-(such as the University of Denver Research Institute and the new Rocky Mountain Institute for Policy Research, based presently at Utah State University.)

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[2] R. B. Kidman, LASL, 1974 Rocky Mountain Energy Flow Patterns, LA 6107-MS, September, 1975.

[3] "Summary of Rocky Mountain Land Use and Natural Resources Bills," Federation of Rocky Mountain States, 1975.

There are, of course, many other similar organizations that play equally important roles. All these organizations deal with parts of the problem, but none addresses the question of initiating regional policy. For one or more of these institutions to initiate consideration of inter-regional energy policy planning would require: 1) a change in direction, and in some cases, new legislation; and 2) a similar organization in another region to cooperate with.

HOW MUCH TIME DO WE HAVE?

I don't know how much time we have, but I suspect it is very little. It certainly is if our aim is to keep to Project Indepe dence's timetable (more on that later). In any case, we do know that if we want anything to happen within three years or less, we will have to depend on existing organizations.[4] In the Rocky Mountains this would mean depending in large part on one or more of the organizations mentioned above. We would also have to deal with individuals or organizations similarly inclined and directed, in other regions. This, however, seems to represent an unlikely chain of events. (NB: I am talking in the absence of a national directive which would "glue" regional efforts together. My estimates would be drastically revised in their time and likelihood should that situation arise.)

We can argue as to whether two years, three years, five years, or X years is an appropriate time schedule. From my reading of what's going on (particularly, the rate of coal development in Montana being at a rate faster than Independence's) we don't have a large amount of time to wait or waste.

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[4]Cunningham's Institutional Law--"One year of talking, one year of organizing, one year of doing."

It seems, therefore, that we must depend on institutions which are already in operation, which function interregionally, and which need not change their charters in order to consider and act upon energy policy initiatives. (Anyone for the Congress? I will return to this again.) Finally, there has to be a sense of urgency--an urgency generated from the common understanding that there is a problem, and a shared recognition that something could/should be done.

ARE OUR EXPRESSED NATIONAL GOALS (Project Independence, etc.) REALISTIC- AND DO THEY MAKE SENSE?

In a talk such as this, the level of discussion cannot be much more than superficial, but it can be provocative. For this reason, I would like to consider the questions raised in offering three seemingly separate viewpoints for consideration.

First, a case can be made that the United States' economic situation results from interdependence, not independence. At the time of the oil embargo we had not achieved interdependence: we needed what the Arabs had, but they didn't need what we had. A better national strategy might be one in which wholesale encouragement is provided to those who have the means for making the Arab world interdependent with ours. This is not exactly an unprecedented activity for our federal government; witness the AID programs, exchange and bilateral arrangements over a period of the last thirty years.

Second, there are many who say that the burning of such a valuable resource as oil is foolhardy. So many "good" things can be made from oil

that we should use that resource for those "good" things. I am not a chemist, but I feel intuitively that this is true. Thus, an interdependence with oil suppliers may not necessarily be a bad thing if it allows us to conserve our resources while expending theirs.

Third, there has emerged what appears to be a new economic world. The question is, "How has the United States adjusted to the new world?" One indicator of adjustment certainly would be international balance of trade figures. Through October 1975, the U.S. balance of trade ran a record surplus of $9.497 billion, and a record surplus for the entire year is virtually assured.

Now, I am not pollyanna-ing the situation. Inflation has taken its toll and we are still far too dependent on the rest of the world for our oil supply. The question I raise here is whether Independence in 1985, 1992 or 2000 is reasonable or desirable? I personally do not think that it is reasonable--and that the above three points suggest it is not necessarily advisable. If it is not, for what purpose are we interregionally cooperating?

WHAT EXPERIENCE DO WE HAVE IN DEALING WITH ENERGY-TYPE PROBLEMS?

To deal with generalizations is risky, but we might ask, all the same, what type of problem is the Energy Problem? Could "Energy" be likened to, for example, the space problem or the defense problem; or does it have issues more similar to those in transportation? I would venture to say that it has some elements of both types. For example, fusion, advanced

solar systems, etc., are high technology, special goal oriented projects. Conservation and individual purchases of existing devices are quite different. I think the focus of the short term problem might well be toward the diffuse product, diffuse market system. Conservation is an individual thing, as is the use of solar heaters for getting hot water. The latter type of problem calls more for governmental interventions on standards setting; for tax breaks for the individual if he conserves; for, in general, "across the board" types of incentives and coordination. Our energy plans are not set up in that posture at present.

WHAT WAYS AND MEANS EXIST TO GET US FROM HERE TO WHERE WE WANT TO BE?

Taken together, the answers to the preceeding questions, although only briefly outlined here, seem to indicate that our energy situation today is the result of non-understanding of the nature of the problem. We now have regional organizations aimed at symptoms rather than causes, garbled national goal presentations, and institutional approaches which are only partially matched to the problem. In this contextual framework, the question is asked, "What are the Prospects for Interregional Energy Policy Planning?" My conclusion is that the prospects are small. And yet, if our solution to the problem is to be viable, the various regions must find ways to cooperate.

As we have proceeded through this talk the tone has been more destructive than constructive--and that is no way to conclude the last session of the last day of the AAAS Annual Meeting. My final conclusion is that there is a way to proceed from here. It does not involve creating new institutions.

It does not even involve changing the mission of existing institutions. It does not involve building new buildings. It does not even involve massive increases in travel or payroll budgets. What it does involve is using the one institution we have which is capable of generating a national position and reacting effectively to the energy situation. I would suggest that this one institution is the Congress of the United States--the forum of elected representatives that make it up.

How can Congress be made more effective in addressing our energy needs? Clearly, the problem is multi-faceted. Just as clearly, it is not one single problem, but a group of interrelated ones. A glib answer would be to suggest that timely information be made available to the decision makers; but information by itself is worthless. Better ways of communicating that information, as well as more receptivity to it on the part of the Congressmen, must occur. I could consider at length ways in which this could happen, ranging from internships (like the AAAS Congressional Fellows Program), forms of semi-formalized continuing education, to problem-oriented videotape presentations and situation game rooms. There are many ways to approach the problem but it is of paramount importance to identify the audience (or market) with whom one is communicating. It would be nice to "educate" the total voting public--and efforts should be made in that direction. But it is far more important to insure that those who must make decisions, every day, be given the equipment to deal with the questions being raised.

Only when communication occurs, can we decide whether a national energy policy, implemented by government actions, is necessary or even desirable.

If it is necessary it can be put together. If such a policy is developed, returning to where we started out, prospects for interregional cooperation in energy policy planning are good, and further, such cooperation is vital if we are to achieve success. Lacking a national policy, I think the prospects are remote indeed.

TABLE I

ENERGY USE

	Used	Efficiency	Export/ Import	BTU/(10^5) Person Yr	Ratio Wyoming/X
Nevada pop. 488,738	98.5	34%	0 total importer	2.02	2.39
Idaho pop. 713,008	128.6	46%	0 total importer	1.8	2.68
Wyoming pop. 332,416	160.2	45%	----	4.82	1.0
Montana pop. 694,409	163.5	45%	5.87	2.36	2.04
New Mexico pop. 1,016,000	195.4	38%	----	1.92	2.51
Utah pop. 1,059,273	251.5	59%	1.12	2.37	2.03
Arizona pop. 1,772,482	284.9	43%	0.14	1.60	3.01
Colorado pop. 2,207,259	386.1	49%	0.02	1.75	2.75

TABLE II[1]

LEGISLATIVE RECORD

	Res Units & Interim Committees	Land Use	Mineral Taxes	Impacted Areas, Taxes Legislation	Plant Siting	Conser-vation	Environmental Protection	Water
Nevada	3/3*	3/8	2/2	2/3	----	2/5	3/4	1/2
Idaho	----	1/7	----	----	0/1	0/1	----	0/1
Wyoming	----	2/4	1/1	6/6	1/1	----	1/1	1/1
Montana	2/2	2/6	1/1	6/6	1/1	----	1/1	1/1
New Mexico	3/5	1/4	----	4/4	----	0/1	1/3	3/4
Utah	----	0/1	0/5	6/9	3/4	6/8	2/2	1/7
Arizona	0/2	1/4	0/5	0/5	1/2	4/6	6/13	0/5
Colorado	0/4	0/9	1/3	3/8	----	0/9	0/8	1/3

*ratio is that of bills passed to bills introduced

[1]Source: "Summary of Rocky Mountain Land Use and Natural Resources Bills," Federation of Rocky Mountain States, 1975

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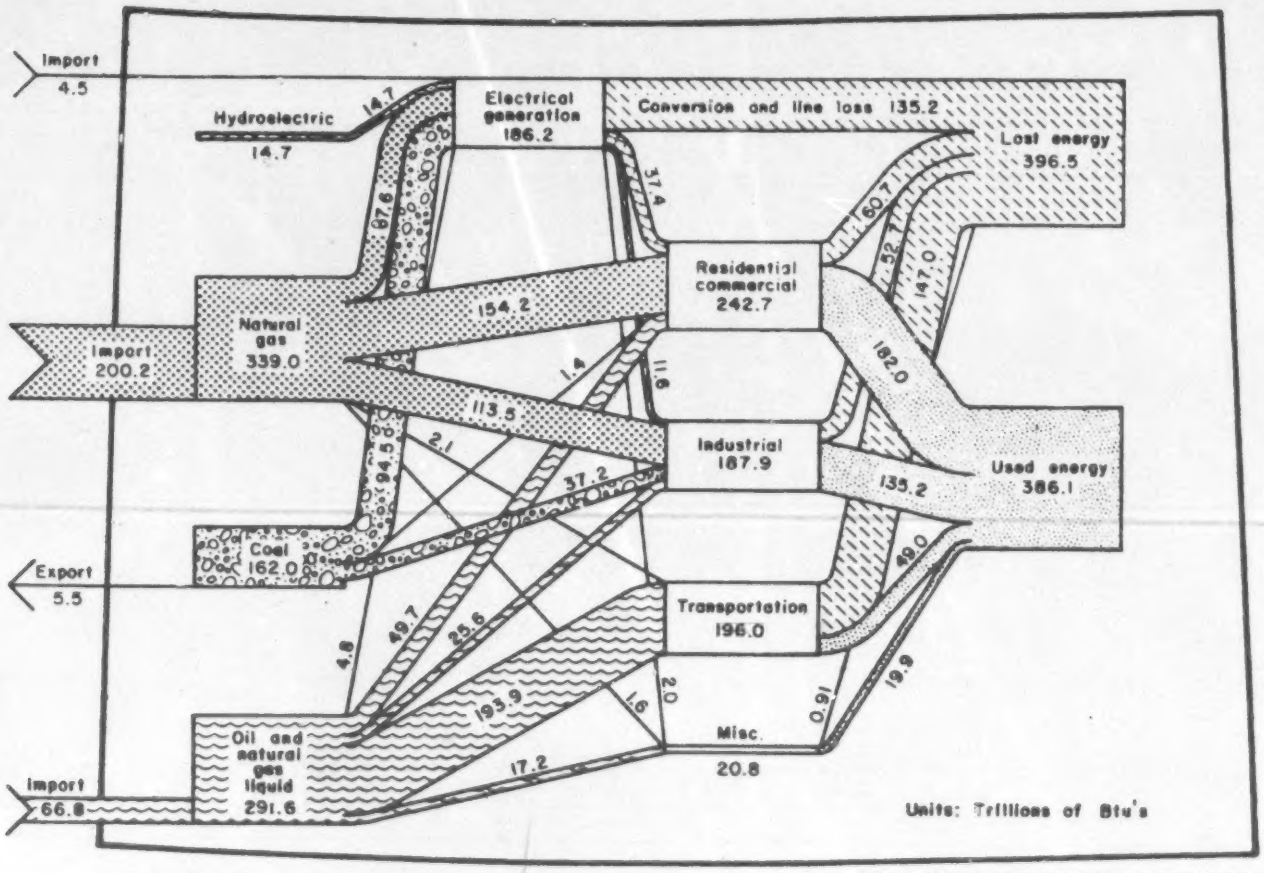
COLORADO 1974



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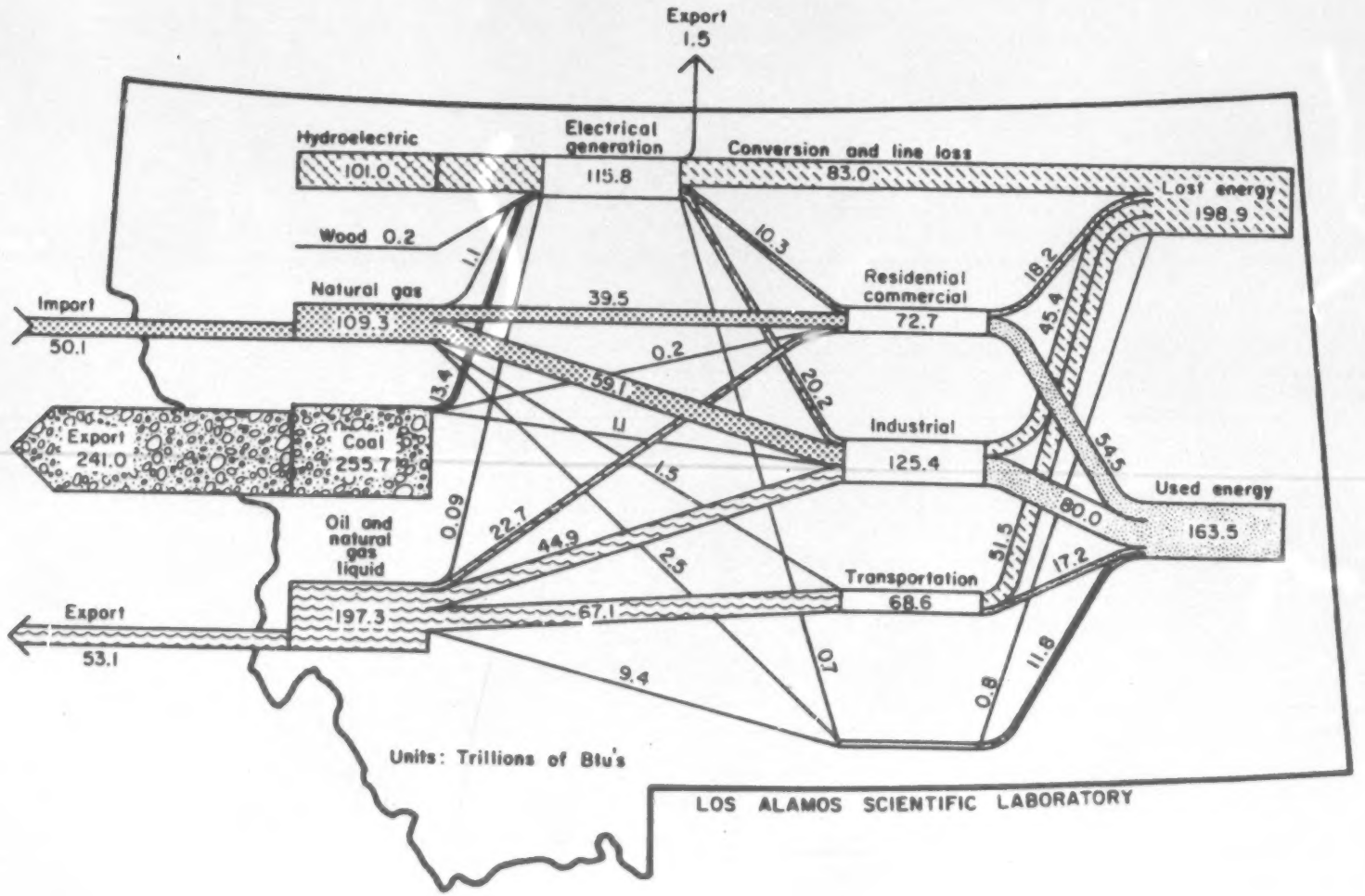
MONTANA 1974



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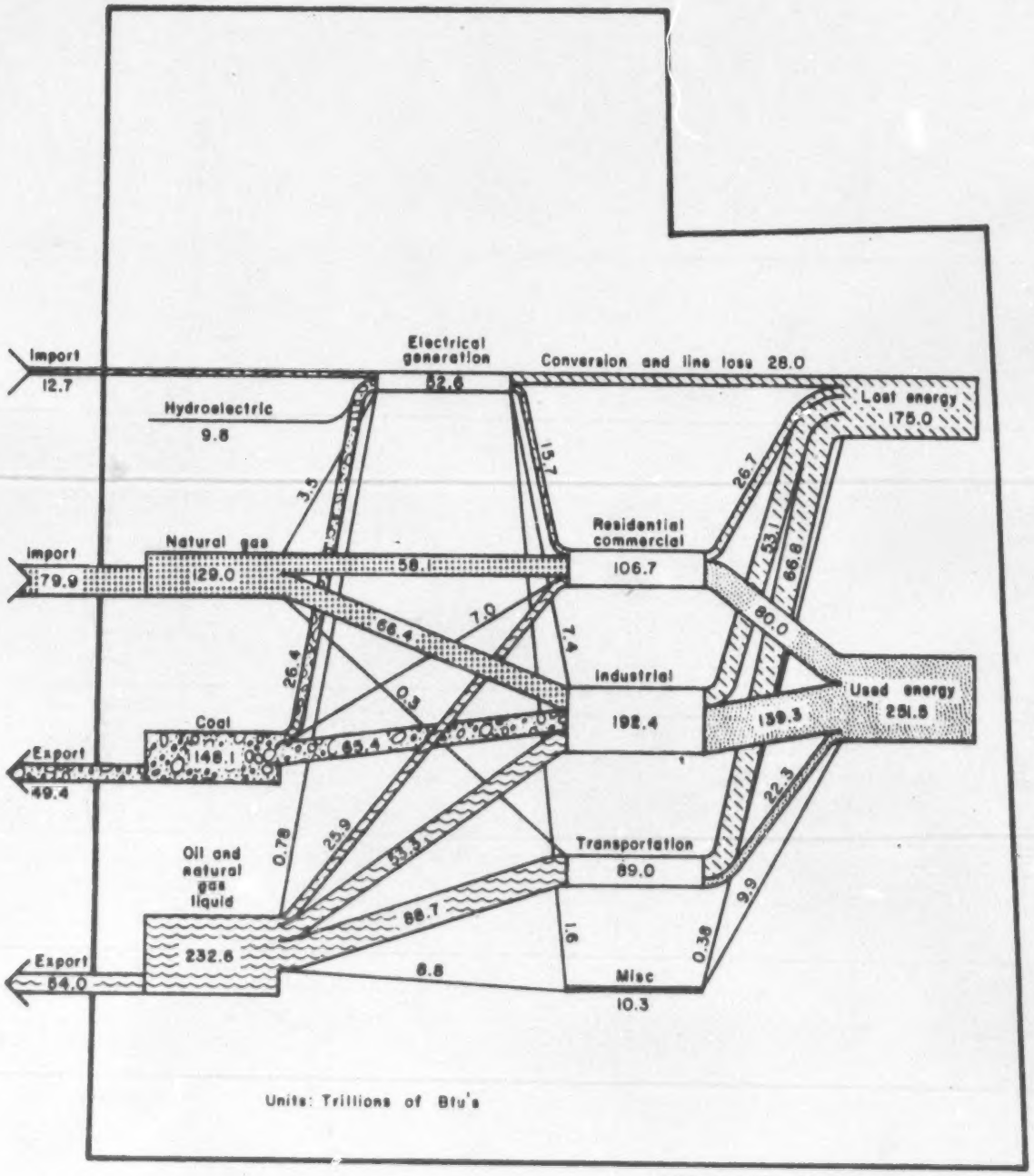
UTAH 1974



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- **Public Information**—supplies reliable reports to the news media on the latest developments in science and science-related public policy issues from materials published in *Science*, papers presented at the Annual Meeting (covered by more than 500 reporters and science writers), and results derived from the various AAAS programs.
- **Public Understanding of Science**—develops programs to improve the quality of science presentations in the media and conducts seminars on crucial issues relating to science and technology in cooperation with community organizations throughout the country.
- **Public Policy**—sponsored authoritative studies of such problems as herbicide assessment, energy use, and air conservation, and is helping to develop seminars for members of Congress and their key staff aides and for science attachés of foreign embassies, and also sponsors a program for Congressional Fellows in science and engineering.
- **International Programs**—aids in the exchange of ideas and individuals through scientific groups in Latin America, Africa, Asia, the USSR, and the United Kingdom; also coordinates various activities and prepares reports on problems of international concern, such as population, women in development, and Habitat.
- **Science Education**—prepares guidelines for and conducts programs in teacher education; develops and publishes precollege and college level science-education materials; and conducts short courses for college teachers.
- **Opportunities in Science**—helps to coordinate programs of AAAS and its affiliated societies to improve the educational and professional opportunities in science for minorities, women, and handicapped persons.
- **Publications**—*Science Books & Films*, *Science Book List*; *Science* compendia on energy, population, food, and others to come; audiotape cassette albums on energy, origins, cancer, the physical world, and others.